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NOTES ON PHYTOMYZA WITH A DESCRIPTION OF A NEW SPECIES. (DIPTERA).

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Attention is called to some characters used by the writer. The dorso-central bristles are numbered from the anterior edge of the mesonotum designating the bristle in front of the transverse suture as the first dorso-central. Hering (1927)¹ numbers them in the reverse direction calling the bristle in front of the transverse suture the fourth dorso-central. Previous papers on the chaetotaxy of Diptera have not numbered the dorso-central bristles. The number and arrangement of the setae along the lower and hind margin of the cheeks also lend good characters. The writer speaks of the cheeks collectively as the portion between the eyes and the mouth including the gena or wangen and the bucca. The term occiput has been used to designate the whole of the back of the head. The color of the occiput has been found valuable especially when the yellow of the cheeks continues back of the eye. In some cases the yellow of the cheeks is interrupted near the vertex by the black of the occiput.

The writer (1924)² stated that the larvae of all the species of the genus *Phytomyza* were miners in the leaves of plants. Recent observations by de Meijere (1925-26)³ have shown that certain European species feed on seeds or mine in the pith of the plant. He found that the larvae of *Phytomyza varipes* Macq., live in the calyx cups of *Alectorolophus* and *Rhinanthus* where they feed upon green seeds and that the larvae of *P. flavofemorata* Strobl, have a similar habit, feeding on the seeds of certain species of *Melampyrum*. De Meijere also found that the larvae of *P. orobanchia* Kalt., feed on the unripe seeds of *Orobanche* and later mine in the pith of the stalk of the same plant.

Phytomyza lactuca Frost, has been found common in Pennsylvania. The mines appear towards the middle and latter part of the summer on the under sides of the leaves of *Lactuca scariola integrata*. They are easily overlooked because the mines usually occur on the lower leaves of the plant. The mines are shallow, white in color, long and tortuous and usually follow the mid-rib. When several mines are formed on a single leaf, the mines may anastomose and produce a blotch effect on the leaf. The frass is inconspicuous and scattered in small spots within the mine. The puparium is formed at the end of the mine within the leaf. The mines resemble superficially the mines of the European species *P. atricornis* Meig., but the mines of the latter usually follow the margin of the leaf and may occur on the upper surface as well as the lower surface.

Phytomyza delphiniae n. sp.

A medium to large size species, about three mm. long. Front, face, cheeks, proboscis and setae, halteres, and pleural sutures yellow, palpi and setae and an-

1. Hering, Martin. Die Tierwelt Deutschlands, Zweiflugler oder Diptera, 1927.

2. Frost, S. W. Cornell Univ. Agric. Exp. Sta. Mem. 78, 1924.

3. de Meijere, J. C. H. Tidschr. Entom. 68-69, 1925-26.

tennae, entirely black; the yellow of the cheeks extending back of the eyes but interrupted near the vertex by the black of the occiput; occiput black or dark brown, yellow on lower one quarter and somewhat along lower lateral margins; front slightly longer than wide, about the same width as either eye, sides parallel, not protruding at the insertion of the antennae, frontal lunule deep, oral margin somewhat produced at the centre; hind margin of cheek with a row of setae, about twelve in number, continuing along the outer margin of the occiput and reaching the vertex, two or three irregular rows of smaller setae adjacent to these on the lower outer edge of the occiput, oral vibrissae scarcely longer than the accompanying setae along the lower margin of the cheeks; four fronto-orbital bristles the lower pair distinctly weaker, a single row of small forward projecting setae on orbits adjacent to the eye margin extending from the lower frontal-orbital almost to the upper fronto-orbital, an occasional small seta in the row with the fronto-orbitals, three to four small setae on the ocellar triangle between the ocellar bristles; antennae entirely black, second segment with a dorsal bristle and several small setae along the outer anterior margin, third segment rounded at the tip, about as long as broad, microscopically pubescent, arista about twice as long as the third antennal segment, slightly thickened on the basal fourth. Mesonotum and scutellum cinerous, an indistinct yellow spot on each side of the mesonotum immediately in front of the scutellum, pleural sutures broadly yellow including the base of the wings and the anterior humeral callosities, a dark spot on the outer anterior angle of the callosities; four strong dorso-central bristles, all about the same size, four to five irregular rows of acrosticals abundant before the transverse suture and extending almost to the fourth dorso-central bristle, one to two irregular rows of small setae outside the dorso-centrals, 1 strong humeral bristle with several accompanying setae, one distinct intraalar, two notopleurals, one presutural with a row of three or four small setae preceeding it, one supralar, one postalar, one propleural, one mesopleural, one pteropleural, and one sternopleural. Abdomen ♀ dark brown, incisures narrowly yellow, last incisure broadly yellow, ovipositor shiny black, ♂ similar but abdomen lighter brown in color. Legs entirely brown. Wings hyaline, first vein yellow to or slightly beyond the humeral cross vein, costa extending to or slightly beyond the termination of vein three, veins 1, 2, 3 and 5 heavy, vein 4 pale, 2nd, 3rd and 4th sections of costa as 3-1-1½, veins 2 and 3 curving gently and terminating parallel in the wing margin, veins 3 and 4 diverging from the base to the tip of the wing, vein 4 nearly straight, terminating slightly beyond the tip of the wing, posterior cross vein scarcely more than its own length from the division of veins 2 and 3. Halteres yellow, calypteres and fringe pale.

Holotype.—♀, reared as a leaf miner on the leaves of Delphinium, July 18th, 1927 by Dr. Grace H. Griswold. Thirty one paratypes also reared by Dr. Griswold, 16♂ and 15♀ bear the same host plant and locality. The species runs close to the European species *P. insperata* Hendel. The latter, however, is a smaller species and makes linear mines on *Solidago*.

The larvae of *P. delphiniae* make blotch mines on the leaves of cultivated Delphinium and appear to be a pest in green houses. Similar mines have been received from Interville, Pa. which may prove to be the same species. Six or seven larvae may feed in the same mine.

THE NYMPHS OF THE STYLURUS GROUP OF THE GENUS
GOMPHUS WITH NOTES ON THE DISTRIBUTION OF THIS
GROUP IN CANADA. (ODONATA).

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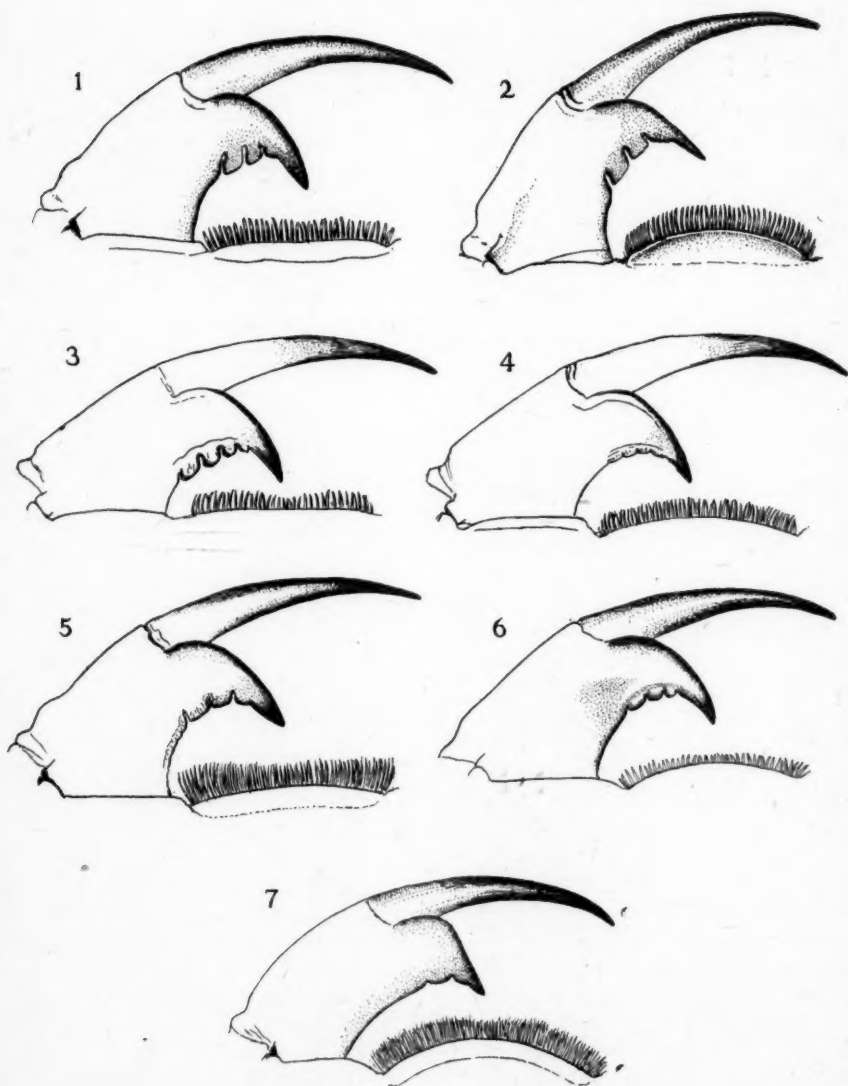
The recent acquisition, through the kindness of Rev. L. M. Stöhr, of exuviae of *Gomphus amnicola* Walsh, accompanied by adults found emerging, led the writer to examine such specimens of allied forms in the Royal Ontario Museum of Zoology as were available for comparison. As these proved inadequate for the purpose, I appealed to Professor C. H. Kennedy and Mr. E. B. Williamson and, through their kind and prompt response, I obtained sufficient material for the study of those species most nearly related to *G. amnicola*, viz., the members of the Stylurus group.

This group is not sharply separated from the Gomphurus group and *G. amnicola* is on the border-line between the two, having indeed been placed with *G. scudderi* in the latter group by Needham. As far as the nymphs are concerned there appear to be even less sharp distinctions between the two groups than in the adults, but, as I have seen no nymphs of any of the typical species of Gomphurus (*G. vastus*, *dilatatus* and *ventricosus*), I have limited the present study to the Stylurus group, including within this group the following species: *Gomphus spiniceps*, *plagiatus*, *notatus*, *scudderi*, *olivaceus*, *intricatus*, and *amnicola*.

The typical Stylurus nymph, as represented by *G. spiniceps*, *plagiatus* and *notatus*, has a long and narrow abdomen, little or no wider than the head and but little depressed, being, in fact, somewhat compressed and tectate on segments 8 and 9; with the 9th segment longer than the 8th, and longer than its basal width; lateral spines on segments 6 to 9, those of 9 shorter than segment 10; a middorsal impressed line as far as the 8th segment, and a rudimentary dorsal hook on the hind margin of segment 9. Labial palpi with the terminal hook bent at right angles, the flexor margin concave and bearing two to four obliquely cut teeth. Tibial burrowing hooks very small.

According to Needham ('01) the nymph of the Gomphurus group differs only in having the abdomen a little wider than the head, the 9th segment hardly longer than the 8th, very minute rudiments of dorsal hooks on both 8 and 9, and large tibial burrowing hooks. The nymph of *G. scudderi*, which is included in Gomphurus by Needham, has small tibial burrowing hooks and no dorsal hooks or only the faintest trace of one on segment 9 in some individuals. The abdomen is, however, wider than the head and the 9th segment, though longer than the 8th, is no longer than its basal width. The nymph of *G. olivaceus* is about intermediate between *plagiatus* and *scudderi*, resembling the former in having a distinct vestige of a dorsal hook on segment 9. The least typical of the group is *G. intricatus*, in which the abdomen is decidedly broader than the head and somewhat depressed, with the 9th segment broader than long, and the terminal hook of the labial palpus with a more angular bend than usual and with very feebly developed teeth. There are no traces of dorsal spines on any of the segments.

It thus appears that the nymphal characters of the Stylurus and Gomphurus groups merge into one another to such an extent that it seems unnatural to attempt their separation.



Right labial palpus and median lobe of labium of *Gomphus* (*Stylurus*) nymphs: 1. *Gomphus spiniceps*. 2. *G. amnicola*. 3. *G. notatus*. 4. *G. plagiatus*. 5. *G. scudleri*. 6. *G. olivaceus*. 7. *G. intricatus*.

KEY TO NYMPHS OF THE STYLURUS GROUP

- A Segment 9 of abdomen more than twice as long as its basal width; segment 8 subquadrate, about as long as its basal width *spiniceps*.
- A' Segment 9 of abdomen less than twice as long as its basal width; segment 8 much broader than long B.
- B Greatest width of segment 9 not exceeding the median length*; median line of segment 9 less than one-third longer than the distance from its base to base of lateral margin; hind margin of 9 with a small median tooth C.
- B' Greatest width of 9 (except in exuviae that are more than usually compressed) exceeding the median length; median line of 9 less than one-third longer than the distance from its base to base of lateral margin D.
- C Teeth of labial palpi (lateral lobes) low, their height being much less than their width; median lobe of labium gently convex; lateral spines of 9 about as broad at base as cerci *plagiatus*.
- C' Teeth of labial palpi coarse, their height being almost equal to their width; median lobe of labium nearly straight; lateral spines of 9 narrower at base than cerci *notatus*.
- D Segment 9 distinctly longer than 8; length over 30 mm. E.
- D' Segment 9 scarcely or no longer than 8; length under 30 mm. E'.
- E Teeth of labial palpi rather low and rounded; median lobe of labium distinctly convex, with a fringe of short scales; hind margin of 8 with a distinct though minute median dorsal tooth *olivaceus*.
- E' Teeth of labial palpi coarse and more angular; median lobe of labium feebly convex, with a fringe of long scales; segment 9 without a median dorsal tooth or with only the faintest trace of one *scudderi*.
- F Extensor margin of terminal hook of labial palpi subangularly curved, the teeth very low and rounded; sides of 8 and 9 decidedly convex towards the base; abdomen distinctly wider than head *intricatus*.
- F' Extensor margin of terminal hook of labial palpi evenly curved, the teeth coarse and angular; sides of 8 and 9 only slightly convex; abdomen scarcely wider than head *annicola*.

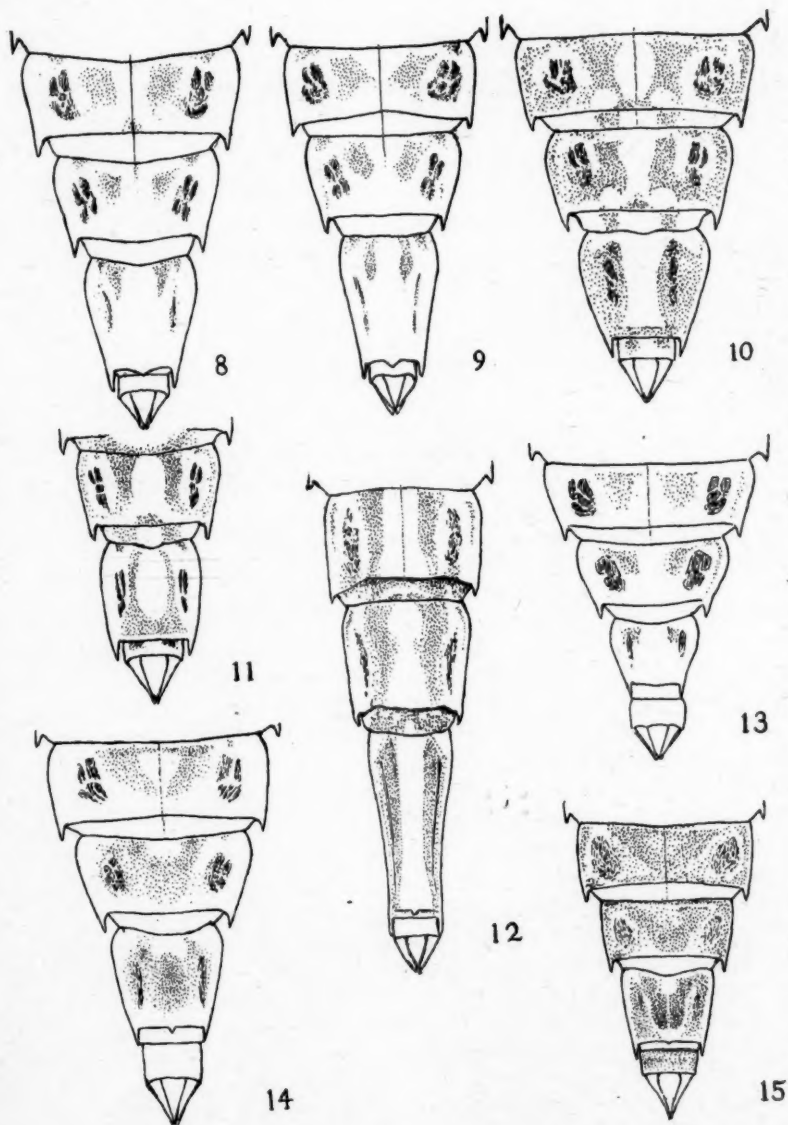
Gomphus spiniceps Walsh.

The nymph of this species has been described and figured by Cabot ('72) and Needham ('97). It is easily recognized by its remarkably elongate abdomen, which shows the characters of the Stylurus group in their most extreme form. This elongation is shared by all the segments except the first and last, though most marked in segment 9. The wing-pads cover only about two-thirds of the length of segment 3. The hinge of the labium barely, or not quite, reaches the hind margin of the prosternum; the middle lobe has a straight margin, and the labial palpi, which are typical in the sharp curvature of the terminal hook, bear two large teeth and a smaller one.

Length 43-45 mm., abdomen 30-31 mm., hind femur 5. Width of head 5.8-6 mm., abdomen 5.5-6.

Of this form I have examined 13 exuviae, one from Fort Wayne, Ind., the others from Alleghany River, Alleghany Co., Pa. All were kindly lent to me by Mr. E. B. Williamson.

*—The length of a segment, as considered here, does not include the intersegmental membrane.



Terminal segments of *Stylurus* nymphs, viewed from above: 8. *G. plagiatus*. 9. *G. notatus*. 10. *G. scudderi*. 11. *G. scudderi*, compressed exuvia. 12. *G. spiniceps*. 13. *G. intricatus*. 14. *G. olivaceus*. 15. *G. amnicola*.

G. spiniceps is rare in Canada. I have seen but two specimens, both males, one taken by Rev. L. M. Stöhr at Lac Pink, P. Q., July 24, 1919, the other by Mr. A. W. Pritchard at Alcove, P. Q., Sept. 16, 1925. Both of these specimens were kindly presented to the writer by the collectors and are now in the collection of the Royal Ontario Museum.

***Gomphus plagiatus* Selys.**

The distinctive characters of the nymph which has been described by Hagen ('85) and Needham and Hart ('01), are as follows: Hinge of labium barely reaching hind margin of prosternum, median lobe gently convex with a rather short fringe, teeth of labial palpi low and rounded. Abdomen about four times longer than wide, its greatest width, at 5, about equal to that of the head; tapering evenly from 6 to the end. A mid-dorsal impressed line as far as base of 8. Segments 8 and 9 rather strongly tectate; 8 nearly twice as broad as long; greatest width of 9 equal to its mid-dorsal length to tip of the rudimentary dorsal spine; distance from base of mid-dorsal line to lateral margin two-thirds of the mid-dorsal length. Mid-ventral length of 10 about one-fourth that of 9. Lateral spines of 9 not quite reaching the hind margin of 10, their basal width usually at least three-fourths of their length and about equal to the basal width of the cerci (lateral appendages), their apices blunt. Lateral margins of 2 to 5 convexly curved with rather deep intersegmental notches, those of 6 to 9 convex towards the base. Color of exuviae pale brown with more or less distinct darker blotches on each side of the pronotum, the meso- and metapleura, and on the abdominal segments towards the base and inside the space between the muscle-scars.

Length 35-37 mm., abdomen 25, hind femur 5. Width of head 6 mm., abdomen 6.

Of this species I have examined 9 exuviae as follows: Havanna, Ill., 5 specimens (one with adult); Sandusky, Ohio; Cedar Point, July 20, 1903, 2 exuviae with ♂ and ♀ adults; one without data.

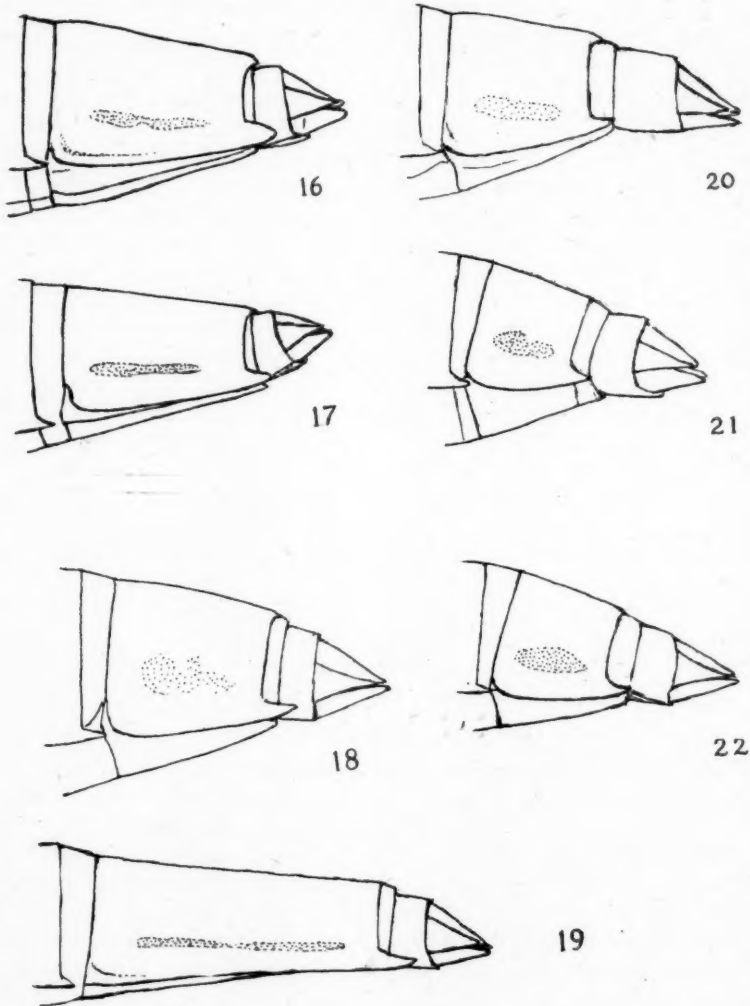
G. plagiatus has not been reported from Canada.

***Gomphus notatus* Rambur.**

The nymph has been briefly characterized by Needham ('03) and figured by Garman ('27). It is very similar to that of *plagiatus*, differing as follows: Teeth of labial palpi much larger and more angularly cut; median lobe of labium with the distal margin straight or very nearly so. Abdomen a little slenderer distally, the greatest width of segment 9 less than its mid-dorsal length; distance from base of middle line to lateral margin slightly less than two-thirds the mid-dorsal length. Lateral spines of 9 more slender, their basal width being usually half, or little more than half, of their length, and less than the basal width of the cerci.

Length 34-35 mm., abdomen 24-26, hind femur 5. Width of head 5.8-6.0 mm., abdomen 5.5-6.0.

The material examined consists of 8 exuviae from Ironton, Ohio, May 31, 1899 (from Kennedy); 2 exuviae from Isle d'Orleans, Quebec, Aug. 25, 1904; one nymph with partly emerged adult, Gull Lake, Lake Nipigon, July 23, 1923; and a number of partly grown nymphs from the stomachs of sturgeon and suck-



Terminal segments of *Stylurus* nymphs, dorso-lateral view: 16. *G. plagiatu*s. 17. *G. notatu*s. 18. *G. scudderi*. 19. *G. spiniceps*. 20. *G. olivaceu*s. 21. *G. intricatu*s. 22. *G. amnicola*.

er, taken in Lake Nipigon, Ont. The nymph was first described by Needham from specimens taken at Nashville, Tenn.

This species was first recorded from Canada by Provancher ('77) as *G. fluvialis* Walsh. No definite locality is given, but the Province of Quebec is undoubtedly intended. Besides the other Canadian records mentioned above, this species has been reported from Lake Timiskaming, Ont. (Ent. Rec. '14) and I have 2♂ 1♀ from Aweme, Man., taken on July 19, 1910, by Mr. Norman Criddle. There is also a ♂ in the National Collection, Ottawa, taken by Mr. F. Ide at the Mer Bleue near Ottawa, Ont., July 23, 1923.

***Gomphus olivaceus* Selys.**

The nymph of this western species has been characterized and figured by Kennedy ('17). I have examined two of his exuviae, both from Golconda, Nevada. In their general appearance they are very like *G. plagiatus* and *notatus*, differing from both in the broader abdomen, the less sharply tectate dorsa of 8 and 9, the shorter 9th segment, which is about one-fourth longer than the 8th; in the smaller and more closely appressed lateral spines of 9, and in the much larger size of 10, even when allowance is made for the fact that, in both specimens, this segment is perhaps somewhat unnaturally extended. The mentum of the labium is a little broader than in *plagiatus*, the median lobe a trifle more convex; the teeth of the palpi similar but a little larger than in most specimens of the latter species.

As compared with *G. scudderi*, *olivaceus* is paler and not so heavily blotched, the abdomen is more tapering, the 9th segment being a little narrower, with the lateral spines more appressed, the 10th segment much larger; the median lobe of the labium a trifle more convex, with a much shorter fringe of scales; the teeth of the labial palpi much lower and more rounded; and in the presence of a vestigial dorsal hook on 9, which is wholly lacking in *scudderi* or is indicated by the merest trace.

Length 35-38 mm., abdomen 24.5-25.0, hind femur 5.5. Width of head 6.0-6.5 mm., abdomen 7.0-7.5.

G. olivaceus has been recorded in Canada only from Peachland and Penticton, B. C., in the Okanagan Valley (Walker, '27). It should be looked for in the semi-arid regions of southern Alberta.

***Gomphus scudderi* Selys.**

The nymph of this species has been described by Needham ('01), who reared it in numbers at Saranac Inn, N. Y. I have found the exuviae in Algonquin Park, Ont., and have received specimens from Mr. Paul Hahn from the Blind River, Ont. My first specimen was sent for determination to Professor Needham, who pronounced it *G. plagiatus*, and under this name it was recorded by me in 1906. I began later to suspect this nymph of belonging to *scudderi* from circumstantial evidence, but not only was Needham's determination opposed to such an opinion, but his figure (Needham, '10, pl. 18, fig. 2), a photograph, did not appear to belong to the same species as mine, owing, as I discovered later, to lateral compression of the abdomen in my specimens. After a few years' acquaintance with the Ontario fauna I knew that *G. plagiatus* was not a regional species, so that I referred my exuviae to *notatus*, the nearest ally of

plagiatus, whose nymph was unknown at the time of Needham's determination, and which, when described, was stated to be extremely similar to the latter species. On receiving, finally, one of Needham's exuviae of *scudderi* from Mr. Williamson the mystery was at once cleared up, but meanwhile, as a result of the confusion of these various species with one another, nymphs of the true *notatus* from the Lake Nipigon region, Ont., were recorded as *scudderi*, (Walker, '24). These errors and my inability to obtain much satisfaction from the published descriptions of nymphs of this group were among the main reasons for my undertaking the present study.

The nymph of *G. scudderi* is, in reality, an easily recognized species. Its distinctive features are as follows: A relatively robust nymph, more heavily blotched than other species, the abdomen a little wider than the head, and about 3 to $3\frac{1}{2}$ times longer than wide (according to the degree of lateral compression of the exuvia); regularly tapering in the natural condition, but frequently compressed distally so as to appear contracted at the base of 9. Segment 8 more than twice as broad as long; 9 about a third longer than 8, appearing when not compressed a trifle broader than long, distance from base of mid-dorsal line to lateral margin very little shorter than the mid-dorsal length; lateral margins rather strongly convex towards the base. Lateral spines of 9 half as long to nearly as long as segment 10, measured dorsally. Ventral length of 10 about one-third that of 9. Middle lobe of labium gently convex, with the fringe coarse and longer than in *plagiatus*, *notatus* and *olivaceus*.

Length 35-37 mm., abdomen 22-25, hind femur 5.5 Width of head 6.0-6.7 mm., abdomen 7.0-8.5.

G. scudderi is common on the rivers of Algonquin Park, Ont., and I have also specimens from the Mississauga and Blind Rivers, Ont. (P. Hahn). I have collected it as far north as Lake Timagami, Ont., but it has not yet been taken in the Thunder Bay District, the records of nymphs from that region (Walker, '24) belonging to *G. notatus*.

***Gomphus intricatus* Hagen.**

This is another western species of which I have examined but a single exuvia, received from Professor Kennedy, who has described and figured it (Kennedy, '17). As already mentioned it is the least typical of the *Stylurus* group, exhibiting the opposite extreme to that shown by *G. spiniceps*. Its most distinctive character is the shape of the terminal lobe of the labial palpus, the extensor margin of which is not evenly curved but subangularly bent a little before the middle, the distal part being straight; and the very slight development of the teeth on the flexor margin. The median lobe of the labium is rather strongly convex with a well developed fringe.

Length 28 mm., abdomen 18, hind femur 5. Width of head 4.7 mm., abdomen 7.0.

The only known Canadian specimens of *G. intricatus* are 2 ♀s from Saskatoon, Sask., July 23, 1910, (T. N. Willing) and Aug. 22, 1924 (N. Ford), and 1 ♂ from Iddlesleigh, Alta., late July, 1920 (F. B. Adamstone). The specimen taken by Miss Ford was newly emerged, though taken so late in the season. All three specimens are in the collection of the Royal Ontario Museum of Zoology.

Gomphus amnicola Walsh.

The nymph of *G. amnicola* is included in the key given by Garman ('27) and a photograph of the labium appears on plate V of that work. No description of the nymph is given, however, and the labium evidently belongs to a different species from that which is here described.

Exuvia slender and rather delicate, pale brownish, faintly clouded on the abdomen with darker median blotches. Head about as wide as the abdomen, widest a little behind the middle of the eyes, its postero-lateral margins, viewed dorsally, continuing almost the same curve as that of the eyes; hind margin deeply excavated; a subocular fringe of long hairs, extending from near the base of the antennae to the occiput. Hinge of labium reaching back as far as the anterior surfaces of the mesocoxae; mentum contracted in the proximal two-fifths, the sides of the remaining three-fifths straight and only slightly divergent, width at base about two-thirds the width at apex, and the latter equal to about two-thirds of the length. Median lobe convex, with a fringe of about 40 to 45 rather coarse, bristle-like scales. Labial palpus broad at base, the terminal hook

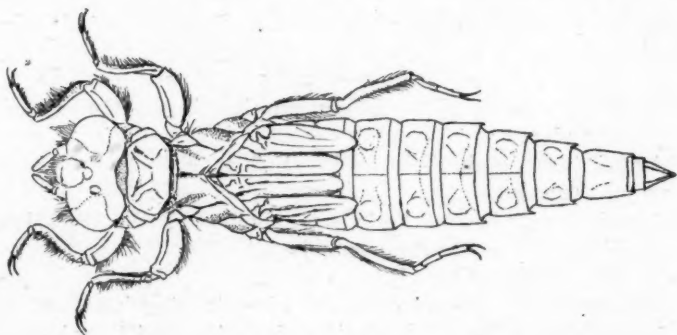


Fig. 1. Nymph of *Gomphus amnicola*.

with the extensor margin evenly curved, the apex directed at right angles with the axis, the concave flexor margin with two large proximal teeth and a smaller, somewhat indistinct distal one. Legs very hairy, the first two pairs with vestigial tibial burrowing hooks. Wing-pads reaching to base of 4. Abdomen lanceolate, widest at 3 or 4, segments 3 to 5 being of nearly equal width; thence tapering evenly to the apex. Lateral margins of abdominal segments but little convex at base, those of 6 to 9 bearing slender lateral spines, which increase caudad slightly in length. Segments 1 to 6 subcylindrical, 7 to 9 increasingly compressed, 9 being somewhat tectate. A mid-dorsal impressed line on 3 to 7; the merest vestige of a dorsal hook present on the hind margin of 9 in one specimen. Segments 3 to 8 subequal in length; 8 almost twice as wide as long; 9 one-fourth longer than 8, its basal width one-sixth longer than its apical width, and slightly exceeding its length; distance from base of mid-dorsal line to lateral margin about equal to mid-dorsal length. Mid-ventral length of 10 one-third to two-fifths that of 9. Anal appendages three-fourths as long as 9; base of median appendage

rather less than half its length and about one-half greater than basal width of cercus; cerci acuminate and slender-pointed.

Length 27.5-29.0 mm., abdomen 18.0-19.0, hind femur 4.0. Width of head 5 mm., abdomen 5.2-5.5.

Described from three exuviae, accompanied by adults. Gatineau River, near Larose, P. Q., June 26, 29 and 30, 1920.

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TWO NEW SPECIES OF COLEOPTERA.*

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The two species described below live in the burrows of the common prairie dog.

***Saprinus cynomysi* n. sp.**

Length (apex of thorax to apex of suture) 6-6.2 mm.; width 5 mm. Black, strongly shining throughout.

Head moderately finely and sparsely punctate, the punctures becoming very fine and sparse at middle of occiput. Supraocular stria distinct, extending across the front.

Pronotum with a broad, very feeble depression near each front angle; the sides rather closely punctate, the punctures very fine and sparse near the margin; coarse internally, this band of punctures most narrow at middle; base with two irregular rows of coarse punctures and a few fine punctures near margin, these almost obsolete at middle.

Elytra coarsely, rather closely punctured in apical region; the punctures never aciculate, extending to middle between the suture and third dorsal stria, externally confined to apical third except for a few fine punctures which extend to middle; marginal striae with about three rows of confused punctures on each side, a rather narrow row of fine punctures extending across base from the third dorsal stria to lateral margin. Outer subhumeral stria short but strong; oblique humeral joining the internal submarginal which is as long as the fourth dorsal; first dorsal stria considerably shorter than the second and third which are subequal and almost as long as the fourth; the latter extending two-thirds the length of the elytra, not arched at base; sutural stria extending over apical three-fourths of elytra.

Pygidium and propygidium rather closely and coarsely punctured. Prosternum moderately convex; the striae divergent anteriorly, slightly ascending, not foveate. Anterior tibiae finely denticulate; middle and hind tibiae biserially spinulose.

Holotype—Otoe Pasture, Noble Co., Oklahoma, June 29, 1926, (W. J. Brown), No. 2649 in the Canadian National Collection, Ottawa.

Paratypes—3, same data.

This species is closely allied to *lugens* and traces to that species in Horn's table. It is readily distinguished from *lugens* by the impunctate basal half of the elytra; in *lugens* the elytral impunctate area is confined to the scutellar region. In addition, the elytral punctures are never aciculate, and the pronotal punctate area is narrower than in *lugens*. In *cynomysi* the dorsal striae become longer internally and not shorter as in *lugens*. The type specimens show almost no variation in sculpture.

***Aphodius neodistinctus* n. sp.**

Length 4 mm.; width 1.8 mm. Oblong, moderately convex and elongate, parallel. Head and pronotum black, the anterior clypeal margin and lateral prono-

*—Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.

tal margin vaguely reddish yellow; elytra largely dark brown, the sutural interval, apical fifth, and lateral margin broadly toward apex but narrowly at base reddish yellow, a slightly oblique, narrow, reddish yellow band extending from humerus almost to the pale apical region, the markings not definitely limited but with vague borders; underside and legs dark brown, the femora and tarsi paler; strongly shining.

Head five-eighths as wide as the pronotum; moderately convex; with three feeble tuberosities; rather coarsely, closely and somewhat roughly punctate; the punctures less close on the vertex. Clypeus broadly, not deeply emarginate; the angle on each side broadly rounded; sides oblique, not arcuate. Genae very broadly rounded, scarcely prominent.

Pronotum five-eighths as long as wide; the sides feebly arcuate; the hind angles broadly rounded; the base arcuate, with marginal line. Pronotal disk punctate throughout; the punctures unequal in size, moderately close at middle, close on the sides.

Elytra at base slightly narrower than the pronotum, slightly wider posteriorly, the sides almost parallel. Elytral disk finely striate; the striae moderately closely punctured; the punctures strongly transverse, sometimes half as wide as the intervals which they cause to be strongly crenate; intervals with a few fine punctures.

Mesosternum alutaceous and opaque, the intercoxal process without trace of a carina. Metasternum sparsely punctate, the sides alutaceous. Abdomen rather sparsely punctate, strongly alutaceous. Middle and hind femora finely, very sparsely punctate. Anterior tibia strongly tridentate, the margin feebly crenate above the upper tooth. First segment of hind tarsus very slightly longer than the two following; the hind tibia fimbriate at apex with unequal spinules.

Female.—Head and pronotum sculptured as described above; median cephalic tubercle not more prominent than the lateral tubercles. Anterior tibial spur slender, feebly curved. Minor spur of middle tibia about half as long as the major, its apex simple and acute.

Holotype.—♀, Otoe Pasture, Noble Co., Oklahoma, June 29, 1926 (W. J. Brown); No. 2650 in the Canadian National Collection, Ottawa.

This species can be confused only with *distinctus*. It is readily distinguished from the latter by its non-carinate mesosternum and by the remarkable punctures of the elytral striae. The clypeal emargination is slightly deeper and the genae are slightly less prominent in *neodistinctus* also. The author has never seen elytral markings like those described above in *distinctus*, but this color character is probably variable in the present species.

A NEW SPECIES OF NEOTTIGLOSSA (PENTATOMIDAE, HEMIPTERA).

BY W. DOWNES,

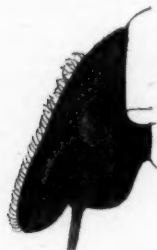
Victoria, B. C.

Neottiglossa tumidifrons n. sp.

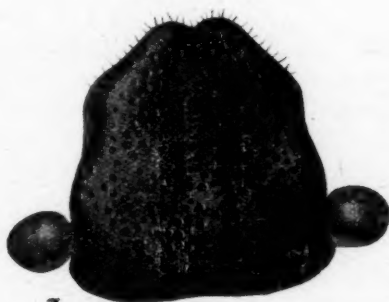
Head, with the portion before the vertex concave and bent downwards, closely punctate above and on the sides, the punctations becoming coarse and uneven near the middle of the concavity. Lower lateral margins of the head carin-



1



2



3



FW.

Heads of 1.—*Neotiglossa cavifrons*; 2.—*N. sulcifrons*; 3.—*N. tumidifrons*.

ated, above which the juga are roundly thickened, the thickening extending without interruption to the extremities of the juga, which are contiguous beyond the tip of the tylus. Tylus slightly raised at the base, depressed at the middle, very coarsely and unevenly punctate, separated from the juga by grooves which are deepest at the base. Apex of the tylus concealed by the extremities of the juga. Lateral carina sinuate, the margins of the head concave beyond the eyes, then roundly angled towards the apex. Vertex broadly and evenly convex and coarsely punctate. Antennae, with the first and third joints equal, slender; fourth and fifth joints fusiform and hairy; the fourth joint three fourths the length of the fifth. Eyes transverse. Prothorax with a shallow transverse depression at the middle. Scutellum with the margins somewhat concave at the middle, the apical portion more acute than that of *sulcifrons*; at the basal angles a longitudinal impunctate raised vitta. Dorsal and ventral surfaces shining and closely punctate, the punctations being smaller on the abdomen. Length, male 4.5 mm., female 5 mm.

Color, mottled brown and dull white; punctate with brown; head, with the thickened portions of the juga usually pale near the outer margins, becoming brown or black in the centre of the concavity. Antennae light brown, rarely black. Prothorax with margins white; two small pale spots on the calli and a median pale line on the prothorax which is frequently continued down the centre of the scutellum. At the basal angles of the scutellum a longitudinal white vitta; a brown blotch at the apex of the scutellum and on the extremity of the corium; membrane greyish white; veins brown; ventral surface black; margins of abdomen white; legs yellow.

This species has been confused in the past with both *sulcifrons* and *cavifrons*. Through the courtesy of Dr. H. H. Knight and Dr. Carl Drake of Ames, Iowa, who kindly loaned their material, I have been enabled to compare it with both these species. It closely resembles *sulcifrons* but differs from it in the form of the head, shape of the scutellum, more elongate form and distinct difference in color which are constant in a long series of specimens at hand. In *tumidifrons* the head is conspicuously concave and the thickened margins of the juga are continued to the apex without interruption, while in *sulcifrons* the concavity is absent or only slightly evident and the juga are subdepressed and sulcate before the middle. It is very distinct from *cavifrons* in which the outline of the head seen from above is nearly circular and the juga broader and flattened, with a circular chaplet of rather long, white, incurving hairs.

N. tumidifrons is distinctly western in its distribution. It occurs commonly on grasses on dry hillsides. In such situations it has been taken in fair numbers at Victoria, B. C. Specimens are also at hand from Yakima, Wash., 27 July (Downes), Hood River, Ore., 28 July (Downes), Marin Co. Cal. 27 Dec. (Dietrich), Missoula, Mont., 1 Aug. (Nichol).

Holotype, male, Saanich district, B. C., July 8, 1924, (Downes).

Allotype, female, Saanich district, B. C., July 10, 1923, (Downes), both No. 2770 in the Canadian National Collection, Ottawa.

Paratypes, 20, in the collections of Dr. H. H. Knight, Dr. Carl Drake, the Canadian National Collection and that of the author.

NOTES ON SPIDERS FROM THE LA SAL MOUNTAINS OF UTAH.

BY RALPH V. CHAMBERLIN,

Univ. of Utah.

The following notes are based upon a collection made by Dr. Vasco M. Tanner and associates during the early part of the summer of 1927 in the La Sal Mountains of San Juan County, Utah.

Dictynidae

Dictyna volucripes Keyserling. One female of this widespread species.

Gnaphosidae

Gnaphosa gigantea Keyserling. One male a little aberrant in details of palpal organ.

Gnaphosa brumalis Thorell. One male.

Drassodes neglectus (Keyserling). Two males and one immature female.

Haplodrassus signifer (C. Koch). Two females.

Herpyllus propinquus Kersebaumer. One immature female probably this species.

***Zelotes lasalanus* sp. nov.**

Cephalothorax and abdomen uniform black. Legs black excepting second tarsal joint which is distinctly paler, the preceding joint in some cases intermediate in color.

Upper margin of furrow of chelicera with three teeth of which the middle one is much largest.

First tibiae unarmed beneath, the first metatarsi each with a single pair of ventral spines at proximal end.

The epigynum suggests that of *Z. subterreanea* in its general structure, but the median area limited by the chitinous rims presents an acute, caudally directed process prolonged more strongly than in *discens* and less strongly than in *gyne-thus*. The spermathecae showing caudad of this area instead of in front of its caudal rim as it does in *subterreanea*.

Length, 6.4 mm.

Holotype, female, the only specimen of the species taken.

Pholcidae

Psilochorus utahensis Chamberlin. Three females.

Theridiidae

Lithyphantes corollatus (Linneus). Several mature females, one mature and one immature male.

*Linyphiidae****Bathyphantes spatulifer* sp. nov.**

Carapace a slightly dusky yellow, with lateral margins behind pars cephalica black. Legs yellow with dark markings as follows: coxae with dark line across distal edge beneath; femora with three annuli, one at base, one distad of middle, and one at distal end; patellae dark at distal end; tibiae and metatarsi each with two annuli, one proximad of middle and one at distal end. Sternum nearly black, the pigment denser at margins. Abdomen dorsally silvery white, with a median dorsal black mark at base with two black dots each side of it

and followed behind by a series of paired dots; sides and venter blackish, the sides with two oblique light lines on each side in front of spinnerets, and venter with epigynal area light, a light spot in front of spinnerets and a pair of light spots behind genital furrow.

Cephalothorax low, the pars cephalica scarcely raised, a little highest caudad of eyes.

Posterior row of eyes straight or very slightly recurved; eyes nearly equidistant, the medians larger than the laterals, not more than their radius apart. Anterior row of eyes slightly recurved; medians much smaller than the laterals and decidedly closer to each other than to the laterals.

Epigynum characterized especially by the form of the median piece which is comparatively long and spatulate in general outline, with a narrower terminal portion truncate distally and followed by a distal tubercle somewhat as in *Lepthyphantes phylax* Chamberlin; the terminal narrower portion and its tubercle extending beyond underlying epigynal plate. The median piece is much narrower than in *B. zebra* and is not distally abruptly shouldered as in that species.

Length, 3 mm.

Holotype, female, the only specimen taken.

Argiopidae

Aranea ocellata Clerck. One immature female.

Themisidae

Misumenoides aleatorius (Hentz). Several immature specimens apparently this species. All are of the pale form.

Thomisus sp. One immature specimen not specifically identifiable.

Lycosidae

Pardosa mackenziana (Keyserling). Two females, a little variant and one male.

Pardosa lapidicina Emerton. One female, light colored form.

***Pardosa saniuana* sp. nov.**

Carapace with a broad median longitudinal light band narrowing down posterior declivity, a little constricted near caudal end of pars cephalica, and extending a short distance as a narrow tongue between posterior eyes, the eye area otherwise black; an interrupted supramarginal light stripe on each side extending anteriorly to level of third eye row. Clypeus pale. Sides of carapace black. Sternum light with black margins and a geminate median longitudinal stripe, the halves fused and pointed behind. Legs yellowish with interrupted black annuli; coxae, trochanters and proximal portion of femora ventrally clear yellow. Abdomen with a dark sagittae outline at base above, followed by dark chevrons separated by paired ocellate light spots. Venter yellow.

Anterior row of eyes much shorter than the second, not fully reaching from middle to middle of eyes of latter; born on a tubercle which protrudes prominently above clypeus.

Characterized especially by the structure of the epigynum. The epigynal area in general outline suggesting that of *P. sternalis* but proportionately broader; posterior median depression occupied by a caudally truncate spatulate process which narrows into a slender anterior process which extends into the anterior median depression but does not wholly cross the latter before vanishing; with

two chitinous rims limiting the depression anteriorly, the caudal of these continuous with the lateral rims bordering the depression, the anterior one short, not extending caudad at ends, only a short distance from the first.

Length, 5 mm.; cephalothorax, 2.75 mm.; tib. + pat. IV, 3.8 mm.

Holotype, female.

Lycosa avida Walckenaer. One adult female without the ventral black mark and one immature male.

Arctosa littoralis (Hentz). One not quite mature female.

Oxyopidae

***Oxyopes tanneri* sp. nov.**

Carapace with integument blackish, clothed on sides with white, partly scale-like hairs. Clypeus on median line below with a light deltoid mark. Sternum yellow on middle, blackish brown at sides. Chelicerae dusky, with a light stripe down face of each. Coxae of legs yellow, black at distal end beneath. Femora of legs black, the fourth ones light, yellow, at proximal end; other joints yellow, annulate with black. Venter of abdomen black, with a longitudinal yellow stripe at each side curved mesad at its caudal end; dorsum with an inversely v-shaped yellow mark at anterior end followed by a series of indistinct transverse light marks.

Abdomen widest in front of middle, more strongly narrowed caudad, the caudal end rounded.

The epigynum with anteriorly directed process distally rounded, the sides straight and parallel to base.

Length, 6.5 mm.

Holotype, female.

Attidae

Dendryphantus capitatus (Hentz). Several adult females of this common form.

NEW OR LITTLE-KNOWN SPECIES OF THE GENUS TIPULA FROM
LABRADOR. (TIPULIDAE, DIPT.).

BY CHARLES P. ALEXANDER,

Mass. Agric. College, Amherst, Mass.

Our knowledge of the crane-flies of Labrador is still very insufficient. The most extensive collections that have yet been made are those of Mr. W. W. Perrett, taken in the years 1922 to 1925, inclusive, at and near Hopedale. This important series is the property of the Canadian National Collection and was kindly loaned to me for examination by Mr. Curran, to whom I would express my sincere gratitude.

The pioneer student of the insects of Labrador, Dr. A. S. Packard, Jr., collected a small number of Tipulidae which were later described by Osten Sacken (Packard, *The Labrador Coast*; 1891). The few records of crane-flies from Labrador, excluding the Packard and Perrett collections, are almost all the result of desultory work of travellers and collectors whose interests lay in other fields. In the present paper, eleven species of the genus *Tipula* are recorded from Labrador.

Tipula grenfelli sp. n.

Belongs to the *tricolor* group; general coloration grey, the praescutum with three brown stripes; antennae of male relatively elongate; flagellum black, the segments feebly incised; wings greyish yellow; basal abdominal tergites orange, darker sublaterally; remaining tergites brownish black; ninth tergite of male hypopygium with a low, rounded median lobe, subtended on either side by a smaller triangular lobe.

Male.—Length about 12.5-14 mm.; wing, 13-13.8 mm.; antennae, about 5 mm.

Frontal prolongation of the head of moderate length, grey above, paler laterally and beneath; nasus of moderate length, provided with yellow setae; palpi brown. Antennae relatively elongate, if bent backward extending to beyond the base of the abdomen; first segment pale at base, the distal half enlarged and darkened, sparsely pruinose; second segment brown; first flagellar segment obscure yellowish brown at base, the distal half and remainder of the organ brownish black; flagellar segments very feebly incised. Head clear grey in front, more brownish grey behind; eyes relatively small, the vertex being very broad; vertical tubercle low but distinct.

Pronotum grey, brownish medially, the lateral portions of the scutellum yellow. Mesonotal praescutum yellowish grey with three conspicuous dark brown stripes; scutum grey, each lobe with two contiguous brown areas; remainder of mesonotum clear grey; scutellum broad, the parascutella correspondingly reduced. Pleura clear light grey, the dorso-pleural membrane buffy-yellow. Legs with the coxae clear light grey; trochanters pale brown; femora yellow, clearer yellow basally, darker outwardly, the tips dark brown; tibiae brown, passing into brownish black outwardly; tarsi brownish black. Wings greyish yellow the apical and caudal portions clearer, subhyaline; base and costal region still clearer yellow, especially cell *Sc*; stigma pale brown; veins dark brown. Venation: Distal section of *R*₂ entirely preserved; petiole of cell *M*₁ a little longer than *m*; *M*₃₊₄ short, approximately one-half *m*.

Abdomen relatively elongate; tergites one to four bright orange, with a dark sublateral stripe, most evident on segments three and four and the posterior ring of segment two; on the remaining segments the coloration is dark except narrow posterior and broader lateral margins which remain pale in color; first segment slightly pruinose; basal sternite brownish grey, the succeeding segments orange, the outer segments greyish brown; hypopygium dark. Male hypopygium as in the *tricolor* group, small, the sclerites fused into a continuous ring. Ninth tergite tumid, the caudal margin with a low, rounded, median lobe that is weakly set with short black setae, the lobe subtended on either side by a small, broadly triangular lobule. Outer dististyle large, roughly oval in outline, dark colored. Suture of the basistyle indicated beneath. Ninth sternite with a V-shaped notch. Eighth sternite unarmed.

Hab.—Labrador.

Holotype.—♂, Hopedale, July 7, 1923 (*W. W. Perrett*); No. 2566 in the Canadian National Collection.

Paratopotypes.—♂, June 19, 1924; ♂, July 12, 1923.

The species is respectfully dedicated to Dr. Wilfred T. Grenfell, whose name has become so intimately connected with the physical and spiritual welfare of Labrador.

Tipula macrolabis Lw. Hopedale, August 4-15, 1925 (*W. W. Perrett*). This marks the eastern limit of this widely distributed Hudsonian crane-fly.

Tipula sarta Lw. Hopedale, July 24-August 4, 1923; June 19, 1924 (*W. W. Perrett*). Through the kindness of Prof. R. L. Webster and Prof. Anthony Spuler, Washington State College, I was able to examine the type-specimen of *Tipula albonotata* Doane and find that it is conspecific with *T. sarta*.

***Tipula subsarta* sp. n.**

Belongs to the *angustipennis* group; closely allied to *T. sarta* Lw., differing especially in the structure of the male hypopygium.

Male.—Length about 15 mm.; wing, 15 mm.

Female.—Length about 18 mm.; wing, 13.5 mm.

Antennae with the basal segment black, brown at base; second segment reddish brown; in some specimens, the scapal segments paler, yellow to yellowish brown; flagellum entirely black, the segments strongly incised; nasus lacking, as in *sarta*. Head darker grey, the brown median line more diffuse.

Pleura clearer blue-grey, including the coxae; dorso-pleural region buffy-yellow. Femoral tips narrowly but conspicuously brownish black.

Abdomen with the sublateral brownish black stripe narrow but clearly defined. Male hypopygium with the tergal region much as in *sarta*, but the eighth sternite quite different, with a short, stout, finger-like lobe on either side, these lobes clothed with a few, very long yellow setae; between these lobes on the margin, a low, triangular median lobule; dorsal of the latter, arising beneath the margin and covering the base of the ninth sternite, a broad subquadrate plate, its apex truncate and fringed with short setae. In *sarta* the eighth sternite is provided only with a median glabrous plate that terminates in two acute spines, the structure somewhat resembling a stick-tight (*Bidens*) seed.

The Alaskan paratype has the thoracic coloration even more obscure, the praescutal stripes being poorly defined. The low median lobule of the eighth sternite is here prolonged apically into a slender, finger-like point. The white wing-pattern is only faintly developed. This specimen measures about 12.5-13 mm. in length, the wing 13 mm. It is very possible that this Alaskan material pertains to still another species or subspecies.

Hab.—Labrador, Alaska.

Holotype.—♂, Hopedale, Labrador, July 18, 1923 (*W. W. Perrett*); No. 2560 in the Canadian National Collection.

Allotopotype.—♀, July 25, 1924.

Paratopotype.—♂, with the allotype; *paratype*.—♂, Healy, Alaska, June 26, 1921 (*J. M. Aldrich*), in the U. S. National Museum.

Tipula canadensis Lw. Hopedale, July 31, 1922; June 21, 1924 (*W. W. Perrett*).

Tipula labradorica Alex. Hopedale, June 18-25, 1924; June 15, 1925 (*W. W. Perrett*).

Tipula septentrionalis Lw. Hopedale, July 5, 1923; June 18, 1924; June 30, 1925 (*W. W. Perrett*).

***Tipula perretti* sp. n.**

Belongs to the *arctica* group; general coloration brownish grey, the mesonotal praescutum with four clearer grey stripes that are narrowly margined with brown; wings strongly tinged with brown, sparsely variegated with whitish areas; abdomen bright orange, the tergites trivittate with brownish black; male hypopygium with the ninth tergite appearing as a thin, flattened, black plate, the caudal margin with a broad U-shaped notch, the angles of which are produced into decurved triangular points.

Male.—Length about 13.5 mm.; wing, 14.3 mm.

Frontal prolongation of head relatively short, greyish brown above, more yellowish laterally; nasus conspicuous; palpi dark brown. Antennae relatively long, if bent backward extending about to the base of the abdomen; scapal segments obscure yellow; first flagellar segment brownish yellow; remaining segments very indistinctly bicolorous, the basal swellings black, the remainder dark brown; flagellar segments rather strongly incised, the apical portion approximately two or more times longer than the basal enlargement. Head light grey with a capillary brown median line.

Mesonotal praescutum brownish grey with four clearer grey stripes that are narrowly margined with dark brown, the lateral margins of the intermediate stripes becoming more or less obliterated in front; scutum dull grey, each lobe with two clearer grey areas that are narrowly margined with brown; remainder of mesonotum grey, with a continuous capillary median brown vitta extending from the suture to the abdomen. Pleura whitish grey, clearer grey on the sternopleurite and anepisternum; dorso-pleural region more buffy. Halteres pale brown, the base of the stem and tip of the knobs yellowish. Legs with the coxae pale brown, pruinose; trochanters brownish yellow; femora brownish yellow, the tips of the latter and remainder of tarsi passing into dark brown. Wings with a strong brown tinge, cells *C* and *Sc* more yellowish; stigmal region and a spot at origin of *Rs* darker brown; restricted but conspicuous whitish areas distributed as follows: Before and beyond origin of *Rs*; a broad crossband beyond the cord and stigma, extending from the costal margin into cell *R*₅, narrowly separated by a dark seam along vein *M*₁₊₂ from a smaller white area across cell 1st *M*₂, including the extreme tip of *R* and the base of *M*₃; a large blotch at near two-thirds the length of cell *M*; an irregular area in the basal portions of cells *M*, *Cu* and 1st *A*; veins dark brown, the costal veins paler; obliterative areas conspicuous. Venation: Distal section of *R*₂ entire, the basal third with machotrichiae; *M*₂₊₄ about three-fourths the first section of *M*₃.

Abdominal tergites bright orange, narrowly trivittate with brownish black on segments one to six; on segments seven and eight the brownish black sublateral stripes are widened out, greatly restricting the ground-color; sublateral stripes narrowly interrupted by the glabrous basal rings of the tergites; lateral margins of the segments rather narrowly pale; sternites similarly orange with three dark stripes, the median stripe becoming evident at near midlength of the abdomen; eighth sternite uniformly darkened, except for the narrow pale apex. Male hypopygium small, the ninth tergite appearing as a relatively small, very thin and flattened, entirely chitinized plate, the caudal margin with a broad, shallow

U-shaped notch, the angles of the notch extended into slightly decurved triangular teeth. Outer dististyle relatively large, pale yellow, gently widened outwardly, the tips obtuse. Ninth sternite with a V-shaped median notch. Eighth sternite unarmed.

Hab. Labrador.

Holotype.—♂, Hopedale, July 17, 1923 (*W. W. Perrett*); No. 2559 in the Canadian National Collection.

This interesting crane-fly is named in honor of the collector, Mr. W. W. Perrett, who had added so materially to our knowledge of the insects of Labrador.

Tipula entomophthorae Alex. Hopedale, June 19-27, 1925 (*W. W. Perrett*).

***Tipula packardii* sp. n.**

Belongs to the *marmorata* group; mesonotal praescutum yellowish grey with four conspicuous dark brown stripes; pseudosutural foveae reduced to a tiny point; wings grey, variegated with subhyaline; M_{3+4} very short, as in the group; male hypopygium with the ninth tergite relatively large, the caudal margin with a V-shaped median notch; ninth sternite extensive, strongly carinate beneath.

Male.—Length about 13 mm.; wing, 12.5 mm.

Frontal prolongation of head brown, somewhat more reddish brown laterally; nasus conspicuous; palpi brownish black. Antennae relatively short, if bent backward extending about to the root of the halteres; first scapal segment pale yellowish brown; second segment yellow; flagellum black; segments scarcely, if at all, incised, with a delicate erect white pubescence; terminal segment very small, narrowed at tip, only about one-half as long as the penultimate. Head brownish grey, with a capillary dark brown median vitta; vertex of moderate width; vertical tubercle very low, with an impressed line.

Pronotum yellowish grey, with a capillary brown vitta. Mesonotal praescutum yellowish grey, with four conspicuous dark brown stripes, the intermediate pair long and narrow distinctly separated; pseudo-sutural foveae reduced to tiny points; scutum brownish grey, clearer medially, each lobe with two separate brown marks; scutellum brownish grey; postnotum grey. Pleura grey, somewhat variegated with darker, especially on the sternopleurite; dorso-pleural membrane buffy brown. Halteres yellow, the knobs brown. Legs with the coxae dark grey; trochanters obscure brownish yellow; femora yellowish brown, the tips rather narrowly but conspicuously dark brown; tibiae brown, the tips passing into dark brown; tarsi brownish black, proximal ends of the basitarsi paler. Wings grey, variegated with subhyaline; stigma darker brown, with a yellowish mark immediately before it; the dusky clouds include the following: Before the cord, crossing cell 1st M_2 ; beyond the stigma, especially in the base of cell R_2 ; in cell M beyond midlength; a streaked area in cell 1st A , the base and apex of cell 2nd A being similarly pale; veins dark brown, the obliterative areas paler; vein R_1 before the stigma yellow. Venation: M_{3+4} very short, as in the group; m oblique in position.

Abdominal tergites reddish brown without distinct stripes, the outer segments somewhat darker, especially the base of the eighth segment; sternites red-

with whitish subhyaline; male hypopygium with the lateral lobes of the tergite relatively large, the caudal margin with a V-shaped median notch, the margins fringed with delicate setae; median area of the dorsal surface sunken, the margins of the depressed area limited by a weak longitudinal carina on either side. Ninth sternite very extensive, the ventral portion strongly carinate. Basistyle completely fused with the sternite. Eighth sternite relatively small, unarmed.

Hab. Labrador.

Holotype.—♂, Hopedale, August 24, 1924 (*W. W. Perrett*); No. 2562 in the Canadian National Collection.

This interesting *Tipula* is named in honor of the late Dr. Alpheus S. Packard, Jr., who was apparently one of the first to collect crane-flies in Labrador.

***Tipula productella* sp. n.**

Belongs to the *marmorata* group; general coloration grey, the praescutum with four broad, dark brown stripes; wings brownish grey, sparsely variegated with whitish subhyaline; male hypopygium with the lateral lobes of the tergite ending in decurved blackened points; basistyle produced into a fingerlike lobe; a long yellow lobe arising from the ninth sternite; eighth sternite large, deeply emarginate medially, the lobes conspicuously clothed with long yellow setae.

Male.—Length about 10 mm.; wing, 12.3 mm.

Frontal prolongation of head dark brown, the nasus elongate, with a few long yellow setae. Antennae of moderate length, if bent backward extending to shortly beyond the wing-root; scapal segments obscure yellow; flagellum brownish black, the segments feebly incised, the basal enlargement a trifle darker than the apical portion of the segment; terminal segment very small, not longer than the basal enlargement of the penultimate segment. Head yellowish grey, darker behind.

Mesonotal praescutum yellowish grey, with four broad conspicuous dark-brown stripes, the intermediate pair only narrowly separated; all interspaces obscure; pseudosutural foveae reduced to small, circular points; scutum discolored; remainder of mesonotum dark grey, the scutellum more brownish grey. Pleura yellowish grey, indistinctly variegated with darker grey to form vague darker stripes, including the sternopleurite; dorsopleural region buffy. Halteres obscure yellow, the knobs darker, with pale apices. Legs with the coxae light grey; trochanters yellow; femora obscure yellow, the tips narrowly blackened, preceded by a more or less distinct yellow ring; tibiae yellowish brown, the tips darkened; tarsi dark brown. Wings with a brownish grey tinge, sparingly variegated with whitish subhyaline areas, as in the *marmorata* group; cell *Sc* darker; stigma elongate, brown; a brown cloud on the anterior cord; a brown marginal cloud at end of vein Cu_1 ; the subhyaline areas include an obliterative region before the cord; a post-stigmal area and spots near midlength of cell *M*, on both sides of *m-cu*, at one third and at near midlength of cell *Cu* and in the outer ends of the Anal cells; veins dark brown, the obliterative areas extensive. Venation: M_{3+4} short, as in the group, being only about one-third *r-m*; cells M_1 and 1st M_2 large and ample.

Abdominal tergites brownish yellow, darker sublaterally, especially on the basal segments; outer segments more uniformly darkened; caudal margins of segments narrowly pale; sternites brownish yellow, the caudal margins ringed

with paler; eighth and ninth sternites dark, the caudal lobes of the eighth sternite conspicuously pale. Male hypopygium with the tergite of moderate size, the caudal margin with a V-shaped median notch, the lateral lobes terminating in acute blackened decurved points that are gently divergent, the extreme apex of each further produced into a short acute spine. Ninth sternite extensive, the ventral portion restricted and not markedly carinate. Basistyle produced into a slender, fingerlike lobe, directed dorsad and but slightly caudad, clothed with erect setae. Outer dististyle very narrow, pale, only sparsely setiferous. Immediately ventrad and caudad of the basistyle arises a more slender, elongate lobe, light yellow in color, densely clothed with silken setae that are directed dorsad and caudad. Eighth sternite large, deeply emarginate caudally, the notch filled with membrane, the lobes conspicuously provided with long yellow setae, including a fringe directed mesad across the median notch.

Hab. Labrador.

Holotype.—♂, Hopedale, September 13, 1923 (*W. W. Perrett*); No. 2563 in the Canadian National Collection.

Tipula productella is most closely allied to the Western North American *T. fragilina* Alex., differing in the details of structure of the male hypopygium, especially the basistyles and eighth sternite.

OBITUARY

PROF. C. W. HOWARD.

Charles Walter Howard, long a member of the American Association of Economic Entomologists died at Wheaton, Illinois, on March 1st from injuries received when he was struck by an interurban train.

Professor Howard was an entomologist of wide experience. Graduating from Cornell in 1904, he went to the Transvaal in 1905 as Assistant Entomologist and on the death of C. B. Simpson, in 1906, was appointed Entomologist. In 1908 he was made Chief of the Entomological Section of the Department of Agriculture of Mocambique, Portuguese East Africa.

Returning to this country in 1911 he became a special Assistant in the Rockefeller Institute for Medical Research, engaged in the search for insect vectors of poliomyelitis. In 1912 he was appointed to the entomological staff of the University of Minnesota but in 1917 resigned his associate professorship to become Professor of Biology and soon Head of the Department in the Canton Christian College (Lingnan University).

In China his attention was quickly attracted to the needs of the silk industry in the Canton region and with remarkable success he began to apply the Pasteur methods to the control of the diseases which were rapidly wiping out silk growing in that section. Entering upon the work with an utter unselfishness and self-effacement, he won the confidence of the Chinese themselves and in 1923 he became Director of the Government Bureau for the Improvement of Sericulture of the Kwongtung Province, a position which he held at the time of his death.

In September last he returned to this country as Head of the Department of Zoology of Wheaton College, with the agreement that he was to return to

Canton for the summer vacation and keep in close touch with the Bureau.

He was a fellow of the Entomological Society of London, a member of the American Association for the Advancement of Science, the Entomological Society of America, the South African Association for the Advancement of Science, the Royal Society of South Africa and other scientific societies. He was a member of the Pan African Trypanosomias Commission and of the First International Congress of Entomology, held in Brussels in 1909. He was to have been chairman of the sericultural section of the Fifth Congress, meeting in August of this year in Ithaca.

To Professor Howard science offered first of all a field for service. Wherever he worked his interest in the human element was paramount. The result was that as a teacher and administrator he had the love and loyalty of his students and his associates. But, withal, he had a very genuine ability for research of a high order and in spite of his manifold duties in public service he had published numerous papers dealing with ticks, tsetse flies, mosquitoes and other blood-sucking arthropods. His studies on the chiggers of Minnesota constituted the first detailed work on these forms in this country.—W. A. RILEY.

A CORRECTION

BY GEO. R. HOPPING.

In the Canadian Entomologist for September 1927, p. 201, through a mistake of the author of the article, the generic name was misspelled *Trachychele*. It should have been *Trachykele*.

